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FACULTY OF AGRICULTURE AND
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DEPARTMENT OF ANIMAL PRODUCTION AND
MANAGEMENT

ASSESSING THE ANTIBACTERIAL ACTIVITY OF
MORINGA AND GINGER ETHANOLIC EXTRACTS ON
BACTERIAL ISOLATES FROM RETAIL PORK

By

ARECHO RONALD OPOLOT

BU/UP/2021/0093

This research dissertation is to be submitted to the department of animal production and management, faculty of agriculture and animal science in the partial fulfillment of requirements for the award of a bachelor of animal production and management from Busitema University

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FINAL YEAR RESEARCH DISSERTATION

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DECLARATION

I, Arecho Ronald Opolot, declare that this information is original and has been developed as my research dissertation in order to be granted a degree in animal production and management at Busitema University.

SIGNATURE: *Arecho Ronald Opolot*

DATE: *08/11/2024*

APPROVAL

This research dissertation is submitted with the approval of my research supervisor:

Ms. Akurut Immaculate

Sign: 

Date: 

DEDICATION

I commit my thanks to my beloved parents Dr. Opolot Henry Nakelet and Mrs. Iyogil Teddy Opolot who with their tireless effort supported me through my university education. My thanks go to my supervisor Ms. Akurut Immaculate, for her advice and counsel in this research.

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ABSTRACT

Public health concerns have been raised, especially in places with weak food safety management, by the growth in foodborne bacterial contamination in pork caused by poor hygiene measures and an overreliance on synthetic antibiotics. In order to combat common bacterial contaminants found in retail pork, this study investigates the possibility of employing natural plant extracts from *Zingiber officinale* (ginger) and *Moringa oleifera* (moringa) as substitute antibacterial agents. The study specifically evaluates the antibacterial activity of ethanolic extracts from these plants against *Staphylococcus aureus* and *Escherichia coli* that were isolated from pork that was sold in Soroti City, Uganda.

23 pork samples were gathered from different Soroti City pork joints and examined for the presence of bacteria. Total plate count (TPC) methods were used to assess the bacterial loads, and the isolates were grown on selective agar media to detect the presence of *S. aureus* and *E. coli*. Then, using the disc diffusion assay, the antibacterial activity of the ethanolic extracts of moringa and ginger was examined. Dimethyl sulfoxide served as the negative control and Oxytetracycline as the positive control in the comparison.

The pork samples had a notable bacterial load, according to the results, with greater contamination levels in Soroti City's Eastern division. The ginger extract had a moderate level of antibacterial action against *E. coli*, whereas neither *S. aureus* nor *E. coli* were significantly inhibited by moringa. Even so, the combined extracts showed more antibacterial activity, although still not as strong as the synthetic antibiotic control.

The possibility of ginger as a natural antibacterial agent against *E. coli* in retail pork is demonstrated by this study, but it also emphasizes the need for more investigation to maximize the effectiveness of plant-based treatments, especially for *S. aureus*. These results provide light on the creation of natural, alternative food safety treatments that encourage the use of locally accessible and culturally appropriate resources to reduce bacterial contamination in meat products.

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND

Pork is a red meat that is commonly eaten (Penkert et al., 2021) and is widely acknowledged to have important nutritional qualities, including high biological value proteins, trace elements, minerals, particularly heme iron, group B vitamins, and significant amounts of energy and other bioactive substances (Reig et al., 2013).

Hong Kong, Poland, and Spain are the top three countries in terms of per capita pork consumption, according to FAO statistics. At 3.4kg per capita consumption, the greatest per capita intake of pork in all of East Africa is in Uganda (Roesel et al., 2019a). In Uganda, there were 7.1 million pigs overall in 2021, a 122.5% increase from the 3.2 million pigs recorded in 2008 due in part to the steady increase in demand for pork (Bureau, 2024). On the other hand, the pig value chain lacks organisation and is also hindered by inadequate lawful protections, subpar input providers, restricted access to monetary services, and a dearth of regulations governing the slaughter and processing of pigs (Kivali et al., 2023). Therefore, it is expected that an increase in the growth, amplification, and dissemination of bacterial foodborne illnesses will accompany pig production (Kivali et al., 2023). The final consumers are more vulnerable to foodborne illnesses as a result of inadequate pork handling practices and elevated levels of microbial pollutants resulting from cross-contamination during slaughter (Kivali et al., 2023; Zhao et al., 2022). Pork is most highly contaminated with microorganisms at the slaughterhouse.

Temperature, pH, water activity (the meat's relative humidity), and nutrient concentration all have an impact on microbial growth, thus these conditions must all be met in the right proportions to encourage the growth of bacteria. Fresh pork's nutritional makeup encourages microbial growth making it an extremely perishable product (Bruckner et al., 2012).

In sub-Saharan Africa, including Uganda, limited access to refrigeration and controlled storage environments can exacerbate bacterial growth in meat products like pork (Aste et al., 2017). While standard practices like good hygiene and sanitation are crucial, additional and alternative methods to control bacterial contamination in retail pork are necessary to ensure consumer safety.

Many African cultures, as well as others, have employed a variety of techniques to prevent microbial contamination and spoiling of food, such as the use of indigenous plants that have

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